

# PATENT ABSTRACTS OF JAPAN

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(71)Applicant : MITSUBISHI PAPER MILLS LTD

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(72)Inventor : IKEDA MITSUHIRO  
SUZAKI KATSUMITSU  
KATO MAKOTO

## (54) INK JET RECEIVING MATERIAL

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To obtain a receiving material having photographic gloss and high transparency by forming an ink absorbing layer as a three-dimensionally crosslinked layer formed from an amphoteric water-soluble polymer containing both of an anionic monomer and a cationic monomer as constitutional units and an aziridine crosslinking agent.

**SOLUTION:** In an ink jet receiving material wherein ink absorbing layer is provided on a support, the ink absorbing layer is formed as a three-dimensional crosslinked layer formed from at least one amphoteric water-soluble polymer containing both of an anionic monomer and a cationic monomer as constitutional units and an aziridine crosslinking agent reacting with the amphoteric water-soluble polymer. The amphoteric water-soluble polymer generates an ion bond between molecules and in molecules and film strength can be increased. Since anionic groups are reacted with the aziridine crosslinking agent to form a chemical bond, a polymer itself is made insoluble by three-dimensional crosslinking and water resistance can be provided to a film itself.

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## Notes:

1. Untranslatable words are replaced with asterisks (\*\*\*)�.
2. Texts in the figures are not translated and shown as it is.

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Dictionary Last updated 03/26/2008 / Priority: 1. Chemistry / 2. Mathematics/Physics / 3. Electronic engineering

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## CLAIM + DETAILED DESCRIPTION

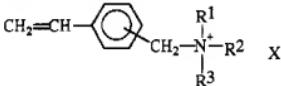
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### [Claim(s)]

[Claim 1] In the ink jet recorded material which prepared the ink absorption layer on the base material Both at least one ionicity water solubility polymer in which this ink absorption layer contains both an anionic monomer and a cationic monomer as a constitutional unit, The ink jet recorded material characterized by being the layer which is formed from this both ionicity water solubility polymer and the aziridine cross linking agent which reacts, and which carried out three-dimensions bridge formation.

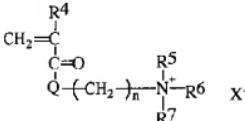
[Claim 2] The recorded material for ink jets according to claim 1 characterized by being both the ionicity water solubility polymer in which both ionicity water solubility polymer contains the cationic monomer which has at least one quarternary-ammonium-salt machine chosen from the compound shown by the general-formula-izing 1 --izing 3 as a constitutional unit.

### [Formula 1]



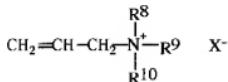
(Among [ R1 ] \*\* 1, R2 and R3 express an alkyl group, an aryl group, and an aralkyl machine, and even if the same, they may differ.) X- expresses halogen ion, sulfate ion, an alkyl sulfonic acid anion, or an alkyl carboxylic acid anion.

### [Formula 2]



R4 expresses hydrogen or a methyl group among \*\* 2 -- Q expresses oxygen or NH group. R5, R6, and R7 express a methyl group or an ethyl group, You may differ, even if the same. X- is the same as X- in \*\* 1. n expresses the integer of 2 or 3.

### [Formula 3]



(Among [ R8 ] \*\* 3, R9 and R10 express methyl, ethyl, or an allyl group, and even if the same, they may differ.) X- is the same as X- in \*\* 1.

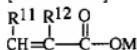
[Claim 3] [ this ink absorption layer ] [ at least one quaternary-ammonium-salt machine chosen from the compound shown by both the ionicity water solubility polymer (a) made into one monomer of a constitutional unit which has at least one quaternary-ammonium-salt machine shown by said general formula-ization 1, said general-formula-izing 2, or \*\* 3 ] The recorded material for ink jets according to claim 1 characterized by containing both the ionicity water solubility polymer (b) made into one monomer of a constitutional unit which it has.

[Claim 4] The recorded material for ink jets according to claim 3 to which quantity of the monomer which has the quaternary-ammonium-salt machine contained as a constitutional unit is characterized by being 50 or less weight % by both ionicity water solubility polymer (b) 50weight % or more by both ionicity water solubility polymer (a).

[Claim 5] Claim 1 -4 characterized by this ink absorption layer containing an aziridine cross linking agent and at least one anionic water solubility polymer which reacts -- either -- the ink jet recorded material of a description.

[Claim 6] Claim 1 -5 characterized by being the water-soluble polymer in which both ionicity water solubility polymer and anionic water solubility polymer contain at least one anionic monomer chosen from the compound shown by the following general formula-ization 4 as a constitutional unit -- either -- the recorded material for ink jets of a description.

[Formula 4]



(R11 and R12 express a hydrogen atom, an alkyl group, a carboxyl group, or its salt among \*\* 4, and M expresses a hydrogen ion, ammonium ion, or a metal ion.)

[Claim 7] Both ionicity water solubility polymer and anionic water solubility polymer at least [ either ] As a constitutional unit, acrylamide, methacrylamide, N, and N-dimethyl acrylamide, N-methylacrylamide, N, and N-diethyl acrylamide, N-isopropyl acrylamide, Diacetone acrylamide, N-MECHIRORU acrylamide, acryloyl morpholine, Claim 1 -6 characterized by being the water-soluble polymer which contains at least one water-soluble monomer chosen from N-vinyl pyrrolidone and 2-METOSHIKI ethyl acrylate as a constitutional unit -- either -- the recorded material for ink jets of a description.

[Claim 8] An aziridine cross linking agent Trimethylol propane tree beta-aziridinyl propionate, N, the N'-hexamethylene 1, 6-screw (1-aziridine cull me SAMIDO), Claim 1 -7 characterized by being at least one aziridine cross linking agent chosen from tetramethylolmethane tree beta-aziridinyl propionate -- either -- the recorded material for ink jets of a description.

[Claim 9] Claim 1 -8 characterized by the whiteness degrees W according [ a base material ] to a Lab color system being 80 or more polyester film or resin covering paper -- either -- the recorded material for ink jets of a description.

[Claim 10] Claim 1 -9 characterized by the whiteness degree W by the Lab color system by the side of the ink absorption layer of this ink jet recorded material being 80 or more in the ink jet recorded material which prepared the ink absorption layer on the base material -- either -- the recorded material for ink jets of a description.

[Claim 11] Claim 1 -8 characterized by Hays (haze value) according [ a base material ] to JIS-K-7105 being 3.0 or less transparent base -- either -- the recorded material for ink jets of a description.

[Claim 12] Claim 1 -8 characterized by Hays (haze value) by JIS-K-7105 of this ink jet recorded material being 5.0 or less in the ink jet recorded material which prepared the ink absorption layer on the base material, the recorded material for ink jets given in 11 either.

[Claim 13] Claim 1 -8 characterized by being the porous ink absorption layer containing a with a refractive index of 1.7 or less pigment grain -- either -- the recorded material for ink jets of a description.

[Claim 14] Claim 1 -8 characterized by being the porous ink absorption layer in which this ink absorption layer contains the pigment grains whose specific surface areas by a BET adsorption method are more than 5m<sup>2</sup>/g, the recorded material for ink jets given in 13 either.

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#### [Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the recorded material used for the printer using an ink jet recording method, or a plotter. The recorded material for ink jets with which especially the request by color record has the gloss of the printing paper tone of a high photograph, It is related what is called with a back print type recorded material which observes the picture printed by the mirror image of the original image from the ink absorption layer side of the porosity on a recorded material with high transparency usable as an OHP film, and a transparent base from the transparent base side.

[0002]

[Description of the Prior Art] A picture full color and high definition moreover has come to be easily obtained by \*\*\*\* better \*\*\*\*\* of an inkjet printer or a plotter in recent years. In connection with this, it is anxious for development of recorded materials for ink jets other than the paper of fine quality and coated paper for a certain ink jet record from the former.

[0003] An ink jet recording method makes the minute drop of ink fly by various operation principles, is made to adhere to recorded materials, such as paper, and records a picture, a character, etc. It excels in high-speed printing nature or low noise nature, and the flexibility of a recording pattern is large, development-fixing has the features, such as needlessness, and the inkjet printer and the plotter attract attention at the point which can form a complicated picture correctly and quickly. As hard copy creation equipment of picture information, such as a character created especially by computer, and various figures, it has spread through urgency in various uses in recent years. Moreover, it is also easy by using two or more ink nozzles to perform multicolor record. The color picture formed by a multicolor ink jet method, In the use which has possible acquiring equal record as compared with \*\*\*\* by the polychromic printing by a platemaking method, or a color photography method, and still few creation number of copies, it is being widely applied from being inexpensive and ending rather than being based on printing technique or photograph technology.

[0004] These days, the inkjet printer which can output the high definition picture which is equal to the picture

of a film photo is inexpensive, and is marketed. Since the recorded material for ink jets is very inexpensive while the picture of this quality is obtained compared with a film photo method, it has big Merritt economically for the user who exchanges a display image frequently with an electric-spectaculars signboard, a sample, etc. of a large area which need a picture. Moreover, a picture is created on the personal computer which is becoming general these days, and looking at print-out for this, by the conventional film photo method, correcting a color scheme and a layout also has the strong point in which such operation can be performed freely, by ink jet record, although it was completely impossible.

[0005] As what attracts attention especially as a field of the invention of an inkjet printer or a plotter these days, Full color image recording, such as production of the color block copy in the printing field as which the quality of image near a photograph is required, and output of the design image in a design section, etc., The picture information created by computer is recorded on a transparent recorded material with an inkjet printer, and using by OHP (overhead projector) by the presentation of a meeting etc. occurs.

[0006] Moreover, the recorded material for ink jet record (back print type recorded material) which observes the picture printed by the mirror image of the original image from the transparent base side is in the ink absorption layer side on a transparent base used for an electric-spectaculars signboard, labeling, etc. the advantage that a film photo method has a very good picture although the film photo film is used as such an electric-spectaculars signboard or a recording material for labeling now -- a certain thing -- it is very expensive and economically disadvantageous for big labeling of picture area, such as a signboard.

Moreover, correcting an original image freely etc. was not completed, having had to request the production from the processing laboratory etc. and looking at a picture in each place of business etc.

[0007] The request to a recorded material is diversified with the spread of the request from the field of the invention of an inkjet printer or a plotter mentioned above, an inkjet printer, or plotters. For example, the recorded material equipped with the outstanding appearance aptitude which has about the same high gloss surface as silver salt color photography, The recorded material for ink jet record (back print type recorded material) which observes the picture printed by the mirror image of the original image from the transparent base side is requested from the ink absorption layer side on the transparent base used for a recorded material with high transparency usable as an OHP film, an electric-spectaculars signboard, labeling, etc.

[0008] As a recorded material used with an ink jet recording method, efforts have been made from equipment or the field of an ink presentation so that the usual paper of fine quality for printing or a note and coated paper can be used. However, more advanced characteristics came to be required also from the recorded material with improvement in the performance of ink jet recording equipment and expansions of a use, such as improvement in the speed and highly-minute-izing, or full-color-izing. That is, it is that the concentration of a printing dot is high and a color tone is brightly skillful as the recorded material concerned, When absorption of ink is early and a printing dot laps, ink flows out or it spreads, or the diffusion to the transverse direction of not carrying out and a printing dot is not large more than needed, and it is required that the circumference should be smooth and should not fade etc. Especially in color record, the color overlapping record which piles up not only monochrome record of yellow magenta cyanogen black but these colors is made, and since the amount of ink adhesion increases further, very severe performance is required.

[0009] As a recorded material for ink jets, it is a JP,55-51583,A number conventionally, for example, 56-157, 57-107879, 57-107880, Although the recorded material obtained by coating silicon-containing pigments,

such as silica looked at by 59-230787, 62-160277, 62-184879, 62-183382, the 64-11877 gazette, etc., on the paper surface with a basin system binder is proposed Although pigment particles, such as silica used in these examples, have large oil absorption and the recorded material which uses these reaches the level of the grade which are generally the absorption capacity of ink, and the point of a rate of absorption Since it is necessary to introduce inorganic pigments, such as silica, into a coating layer so much, it has the fault that the surface gloss of the recorded material itself falls. It is not desirable in order to worsen absorptivity of ink as indicated to previous JP,S56-157,A if it changes to silica in order to improve glossiness, and colloidal silica is used. Or it is a water-soluble binder about detailed alumina sol as indicated in JP,H3-215082,A, 4-67986, a 5-32037 gazette, etc. Although the method of forming the recorded material which has transparency by coating on the base material surface is indicated There is a problem which is inferior in ink absorbency if the ratio to the binder of the alumina sol in a coated layer (quasi-boehmite) is not raised. It is very easy to generate the crack of a paint film in the case of spreading desiccation, and the amount of coatings of the coating layer with such a high pigment ratio is also 20g/m<sup>2</sup>. If it is not beyond a grade, there is a problem it becomes still more difficult from thick film spreading being required since ink absorption capacity is not enough to control of the desiccation conditions in real manufacture etc. Since film strength is still weaker Since the transparency of a paint film is inferior by the surface which carried out ink jet record being ground in addition to the problem on which a picture exfoliates easily, and the various problems of being easy to generate curl being after printing, even when the base material which has the high gloss surface is used, it has the fault that the gloss surface is not obtained. Moreover, it is an ink jet recorded material equipped with the gloss surface, While a coated layer is in a damp or wet condition, the cast coated paper obtained by carrying out cast finishing is indicated to JP,H6-320857,A etc., but as compared with a film photo, the surface gloss is very low, and the texture of a film photo is not obtained.

[0010] On the other hand, in order to form the ink absorption layer which raised transparency and/or glossiness, since the amount of addition is restricted to a small quantity even if it uses whether the above various inorganic pigments are used, ink absorbency is left to the resin layer formed in the base material surface in many cases. As the example of the resin conventionally used for such a use, For example, polyvinyl pyrrolidone which is indicated in a JP,57-38185,A number, a 62-184879 gazette, etc., A vinyl-pyrrolidone vinyl acetate copolymer, a JP,60-168651,A number, 60-171143, the resin composition thing which makes a subject polyvinyl alcohol which is indicated in a 61-134290 gazette, The copolymer of vinyl alcohol, olefin or styrene shown in JP,S60-234879,A, and maleic anhydride, The bridge formation thing of the polyethylene oxide and isocyanate which are shown in JP,S61-74879,A, The mixture of the carboxymethylcellulose and the polyethylene oxide which are shown in JP,S61-181679,A, The polymer which graft-ized methacrylamide to the polyvinyl alcohol shown in JP,S61-132377,A, Polyvinyl acetal system polymer shown in the acrylic polymer which has the carboxyl group shown in JP,S62-220383,A, JP,H4-214382,A, etc., JP,H4-282282,A, Various ink absorbency polymer, such as bridge formation nature acrylic polymer which is indicated in a 4-285650 gazette, is proposed. However, since each of these does not have the water resisting property of the coat itself, a coat dissolves by adhesion of waterdrop etc. and there is a problem by which record is destroyed.

[0011] Although the recorded material which mixed anionic resin with cationic resin at a specific rate, raised the film strength according to the ionic bond of both ions, and raised the water resisting property is proposed by JP,S63-183874,A on the other hand as a recorded material which raised the water resisting property, The

dissolution of the coat by dropping of waterdrop is unavoidable only by an ionic bond. Moreover, although the mixed recorded material of the polymer matrix and absorption polymer which consist of bridge formation nature polymer is proposed by JP,H4-282282,A and JP,H4-285650,A, each of these is adhesion of waterdrop. The surface of the recorded material dissolved in water, and the color dissolved in water and there was [ \*\*\*\* / flowing out of a coat ] a problem on which record is destroyed by that a color bleeds in a coat etc. Moreover, since the printed portion was invaded [ the surface ] by the water in ink, even if it used the base material which has the high gloss surface even if, it was not able to avoid that the surface gloss of the printed portion fell.

[0012] Moreover, since neither an electric-spectaculars signboard nor labeling remains in the exhibition in the interior of a room, it is put on the outdoors in many cases, therefore a picture may be damp with rain and rapid humidity, a picture is asked for a water resisting property. However, generally the picture formed by ink jet record had the low water resisting property, and this had become the big fault of the ink jet method. Moreover, since sunlight is irradiated from the fluorescent lamp light and transparent base side from the ink absorption layer side, the lightfastness of a picture is also required.

[0013] Generally by an electric-spectaculars signboard or labeling, the light which penetrated the picture formed in the ink absorption layer is observed. However, it is also required for a state without such transmission, i.e., the fluorescent lamp for electric spectaculars, to have gone out, and for a picture to be able to observe at least the reflected light from the transparent base side clearly. Moreover, even if an electric-spectaculars signboard etc. is not equipped in the state [ that a picture is recorded with a natural thing ], a natural full color image must be observed.

[0014] As such a back print type recorded material for ink jet record, the recorded material for ink jets which prepared the ink acceptance layer which uses a with a refractive index of 1.58 or less pigment as a principal component in the transparent base material is indicated by JP,S58-136480,A, for example. Since this recorded material uses the pigment for the ink acceptance layer, the absorptivity of ink is good, but the fixability of ink, and a blot or water resisting property of a picture are not enough. And since the refractive index of a pigment is 1.58 or less The whiteness degree of a nonimage area is low, and although it is satisfactory, since the whiteness degree of a nonimage area is insufficient when observing the picture recorded on the recorded material by a reflected light, it can be satisfied with neither the electric-spectaculars signboard stuck on white glass, nor a use like labeling as a full color image with the case where especially a refractive index is 1.45 or less. In order to cope with this, in this gazette, a still whiter ink acceptance layer is prepared on the ink acceptance layer which adjoins a base material, and the ink acceptance layer is considered as two-layer composition.

[0015] Moreover, in JP,H7-2428,B, on a translucency base material, an opaque ink transmission layer should be laminated one by one at a non-porosity ink holding layer and porosity, and come, and this ink transmission layer should receive a recording agent. It is non-dyeing property and the recorded material characterized by a refractive index containing 1.4 or more organic grains is indicated. Since this recording material can use the organic grains of a big refractive index, its whiteness degree of a nonimage area is also high, and a good picture is accepted also by the usual view condition by a reflected light. Moreover, a picture also with clear transmission, such as an electric-spectaculars signboard, is observed. However, in order for all ink not to be absorbed by the ink holding layer of non-porosity and for some ink to remain to a porous ink transmission layer, there is a fault that the water resisting property of a picture is bad and a picture bleeds

with moisture.

[0016]

[Problem(s) to be Solved by the Invention] The technical problem of this invention is offering the ink jet recorded material excellent in the water resisting property. Furthermore, it is offering the ink jet recorded material which solved the problem on which record is destroyed by the surface of a recorded material dissolving in water by adhesion of waterdrop, or a color's dissolving in water in detail, and flowing out of a coat or a color's bleeding in a coat etc. The recorded material for ink jets with which especially the request by color record has the gloss of a high photograph tone, The whiteness degree of a recorded material with high transparency usable as an OHP film and a nonimage area is high, and even when it observes by which of transmission or a reflected light, it is offering the recorded material for ink jet record suitable for the back print type recorded material with which a full color and high definition picture is accepted.

[0017]

[Means for Solving the Problem] The water resisting property which is the technical problem of this invention is solved by the means expressed below. Namely, it sets to the ink jet recorded material which prepared the ink absorption layer on the base material. Both at least one ionicity water solubility polymer that contains both an anionic monomer and a cationic monomer for this ink absorption layer as a constitutional unit, By making it the layer which is formed from this both ionicity water solubility polymer and the aziridine cross linking agent which reacts and which carried out three-dimensions bridge formation, it was solvable.

[0018] Since both ionicity water solubility polymer has both an anionic machine and a cationic machine in a chain, not only between molecules but intramolecular produces an ionic bond, and a film strength becomes very strong.

[0019] Furthermore, since an anionic machine reacted with an aziridine cross linking agent and a chemical bond was carried out, by carrying out three-dimensions bridge formation of the polymer using an aziridine cross linking agent, it was able to make polymer itself have been able to insolubilize and was able to give the water resisting property of the coat itself.

[0020] Moreover, if the polymer which generally has anionic machines, such as a sulfonic group and a carboxylic acid group, and has a cationic machine in a recorded material exists, polymer and a color will combine chemically the color used by an ink jet by counter ion exchange. So, when both ionicity polymer was used, even if the cationic machine in a polymer chain combined with the color which is anionic chemically (fixing of a color) and waterdrop etc. adhered, destruction of record by a color flowing out of a coat could be prevented, and the waterproof high recorded material was able to be obtained.

[0021] The cationic monomer which is the constitutional unit of both ionicity water solubility polymer, and is established in a color has the desirable cationic monomer which has at least one quarternary-ammonium-salt machine chosen from the compound shown by said general-formula-izing 1 --izing 3 from the fixability of a color.

[0022] The inside R1 of \*\* 1, R2, and R3 are alkyl groups, An aryl group and an aralkyl machine are expressed, and even if the same, you may differ. X- expresses halogen ion, sulfate ion, an alkyl sulfonic acid anion, or an alkyl carboxylic acid anion.

[0023] R4 expresses hydrogen or a methyl group among \*\* 2 -- Q expresses oxygen or NH group. R5, R6, and R7 express a methyl group or an ethyl group, You may differ, even if the same. X- is the same as X- in \*\* 1. n expresses the integer of 2 or 3.

[0024] Among [ R8 ] \*\* 3, R9 and R10 express methyl, ethyl, or an allyl group, and even if the same, they may differ. X- is the same as X- in \*\* 1.

[0025] Although it is not necessary to restrict the quantity in particular of this cationic monomer that both ionicity water solubility polymer contains as a constitutional unit, its 5 weight % or more is desirable. At less than 5 weight %, since an ionic bond with an anionic machine also becomes weak and the fixability of a color not only becomes weak, but becomes weak [ the water resisting property or hardness of a coat ], it is not desirable. Moreover, since it will attach with glue stock and admiration will be produced when a hygroscopic property becomes high and it touches by hand if there is too much quantity of this cationic monomer, as for the quantity of this cationic monomer, it is desirable that it is 50 or less weight % preferably 70 or less weight % to the total amount of the water-soluble polymer to be used.

[0026] Moreover, the technical problem of this invention is more effectively solved by the means expressed below. That is, it was able to solve more effectively by containing both ionicity water solubility polymer, and an aziridine cross linking agent and at least one anionic water solubility polymer which reacts in an ink absorption layer.

[0027] Although ink absorbency and the drying property of anionic water solubility polymer are quick, there is no fixability of a color. This both ionicity water solubility polymer and this anionic water solubility polymer are mixed. Without spoiling the water resisting property of a coat, and the fixability of a color, as a result of making polymer itself insolubilize by carrying out three-dimensions bridge formation of the polymer using an aziridine cross linking agent, the absorptivity of ink was able to be raised and desiccation of ink was also able to be made quick.

[0028] Furthermore, if it says in detail, as for immediately after printing, anionic water solubility polymer can mainly absorb ink and a color quickly, and the color can obtain a water resisting property after that by carrying out an ionic bond to the quarternary-ammonium-salt machine of both ionicity water solubility polymer.

[0029] Moreover, the water resisting property which is the technical problem of this invention is more effectively solved by the means expressed below. [ namely, this ink absorption layer ] [ at least one quarternary-ammonium-salt machine chosen from the compound shown by both the ionicity water solubility polymer (a) made into one monomer of a constitutional unit which has at least one quarternary-ammonium-salt machine shown by said general formula-ization 1, said general-formula-izing 2, or \*\* 3 ] It was able to solve more effectively also by containing both the ionicity water solubility polymer (b) made into one monomer of a constitutional unit which it has.

[0030] Both the ionicity water solubility polymer (a) made into one monomer of a constitutional unit which has at least one quarternary-ammonium-salt machine shown by \*\* 1 of this invention is polymer which has a hydrophobic high quarternary-ammonium-salt machine. If it combines with the color which has an anionic machine chemically, a color will insolubilize in water. Therefore, a color dissolves in water, it flows out of a coat or problems, like a color bleeds in a coat are solved. However, since it has a hydrophobic base, the rate of absorption of ink is slow.

[0031] Both the ionicity water solubility polymer (b) made into one monomer of a constitutional unit which has at least one quarternary-ammonium-salt machine chosen from the compound shown by \*\* 2 or \*\* 3 on the other hand is polymer which has the high quarternary-ammonium-salt machine of hydrophilicity. Although it combines with the color which has an anionic machine chemically, a color is not insolubilized

completely. Counter ion exchange is continuously repeated with an adjoining quaternary-ammonium-salt machine, it is neglected in the state humid for a long period of time, or a color diffuses the inside of a coat under the very severe condition of being neglected underwater for a long period of time, and the phenomenon in which a color bleeds in a coat occurs. However, since it has the base of hydrophilicity, the rate of absorption of ink is quick.

[0032] By mixing and using both the ionicity water solubility polymer (a) that has a hydrophobic high base in this invention, and both the ionicity water solubility polymer (b) that has the high base of hydrophilicity Without spoiling ink absorbency, it was able to be neglected in the state humid for a long period of time, and the ink jet recorded material which has the very high water resisting property which can solve problems, like a color bleeds in a coat under the very severe condition of being neglected underwater for a long period of time was able to be offered.

[0033] Furthermore, if it says in detail, both the ionicity water solubility polymer (b) that mainly has the high base of hydrophilicity will absorb ink and a color immediately after printing. After that, by carrying out an ionic bond to the quaternary-ammonium-salt machine of both ionicity water solubility polymer (a), a color can be insolubilized completely and can obtain a water resisting property.

[0034] In order to make a color insolubilize using polymer (a) and to obtain a water resisting property, the quaternary-ammonium-salt machine with which plurality adjoined to color 1 molecule is required, and a waterproof effect is low if the concentration of the quaternary-ammonium-salt machine in polymer (a) is not comparatively high. So, as for the quantity of the monomer which has the quaternary-ammonium-salt machine which polymer (a) contains as a constitutional unit, 50 weight % or more is desirable, and it is desirable that it is 70 more weight % or more.

[0035] In order for polymer (b) not to make a color insolubilize, if it does not need to be high and the concentration of this quaternary-ammonium-salt machine is high rather, compatibility with polymer (a) will worsen and, as for the concentration of the quaternary-ammonium-salt machine in polymer (b), transparency and glossiness will get worse. So, as for the quantity of the monomer which has the quaternary-ammonium-salt machine which polymer (b) contains as a constitutional unit, it is desirable that it is 50 or less weight %, and its 30 more or less weight % is desirable.

[0036] Although the mixing ratio in particular of both the ionicity water solubility polymer (a) used by this invention and both ionicity water solubility polymer (b) does not need to limit, when the ratio of both ionicity water solubility polymer (a) is high, ink absorbency may get worse. Therefore, as for the mixing ratio, it is desirable that both ionicity water solubility polymer (a) is 50 or less weight % to the total quantity of both ionicity water solubility polymer (a) and both ionicity water solubility polymer (b).

[0037] Next, although it is desirable, an example is given, but this invention is not the thing which is the monomer shown by \*\* 1-3 concerning this invention and which is limited to these.

[0038] As a desirable example of a monomer shown by \*\* 1 Bird methyl p-vinylbenzyl ammonium Chloride, bird methyl m-vinylbenzyl ammoniumchloride, Triethyl p-vinylbenzyl ammonium Chloride, triethyl m-vinylbenzyl ammonium Chloride, N and N-dimethyl N-ethyl N-p-vinylbenzyl ammonium Chloride, N and N-diethyl N-methyl N-p-vinylbenzyl ammonium Chloride, N and N-dimethyl N-n-propyl N-p-vinylbenzyl ammonium Chloride, N and N-dimethyl N-n-octyl N-p-vinylbenzyl ammonium Chloride, N and N-dimethyl N-benzyl N-p-vinylbenzyl ammonium Chloride, N and N-diethyl N-benzyl N-p-vinylbenzyl ammonium Chloride, N and N-dimethyl N-(4-methyl) benzyl N-p-vinylbenzyl ammonium Chloride, N, and N-dimethyl N-phenyl N-

p-vinylbenzyl ammonium Chloride, Bird methyl p-vinylbenzyl ammonium A star's picture, bird methyl m-vinylbenzyl ammonium Star's picture, Bird methyl p-vinylbenzyl ammonium Sulfonate, bird methyl m-vinylbenzyl ammonium Sulfonate, Bird methyl p-vinylbenzyl ammonium Acetate, bird methyl m-vinylbenzyl ammonium Acetate, N, N, and N-triethyl N-2-(4-vinyl phenyl) ethylammonium Chloride, N, N, and N-triethyl N-2-(3-vinyl phenyl) ethylammonium Chloride, N and N-diethyl N-methyl N-2-(4-vinyl phenyl) ethylammonium Chloride, N, and N-diethyl N-methyl N-2-(4-vinyl phenyl) ethylammonium Acetate etc. can be mentioned.

[0039] Among the monomers shown by \*\* 2, as a desirable compound For example, N and N-dimethylaminoethyl (meta) acrylate, N, and N-diethyl aminoethyl (meta) acrylate, N and N-dimethylaminopropyl (meta) acrylate, N, and N-diethylamino propyl (meta) acrylate, N and N-dimethylaminoethyl (meta) acrylamide, N, and N-diethyl aminoethyl (meta) acrylamide, The methyl chloride of N and N-dimethylaminopropyl (meta) acrylamide and N, and N-diethylamino propyl (meta) acrylamide, The 4th class ghost by ethyl chloride, a methyl star's picture, an ethyl star's picture, methyl iodide, or ethyl iodide or the sulfonate which replaced those anions, alkyl sulfonate, acetate, or alkyl carboxylate can be mentioned. As a compound especially desirable in this, it is bird methyl 2-(methacryloyloxy) ethylammonium, for example. Chloride, Triethyl 2-(methacryloyloxy) ethylammonium Chloride, Bird methyl 2-(acryloyloxy) ethylammonium Chloride, Triethyl 2-(acryloyloxy) ethylammonium Chloride, Bird methyl 3-(methacryloyloxy) propyl ammonium Chloride, Triethyl 3-(methacryloyloxy) propyl ammonium Chloride, Bird methyl 2-(methacryloyl amino) ethylammonium Chloride, Triethyl 2-(methacryloyl amino) ethylammonium Chloride, Bird methyl 2-(acryloylamino) ethylammonium Chloride, Triethyl 2-(acryloylamino) ethylammonium Chloride, bird methyl 3-(methacryloyl amino) propyl ammonium Chloride, triethyl 3-(methacryloyl amino) propyl ammonium Chloride, Bird methyl 3-(acryloylamino) propyl ammonium Chloride, Triethyl 3-(acryloylamino) propyl ammonium Chloride, N and N-dimethyl N-ethyl 2-(methacryloyloxy) ethyl ammonium chloride, N and N-diethyl N-methyl 2-(methacryloyloxy) ethylammonium Chloride, N and N-dimethyl N-ethyl 3-(acryloylamino) propyl ammonium Chloride, Bird methyl 2-(methacryloyloxy) ethylammonium Star's picture, Bird methyl 3-(acryloylamino) propyl ammonium A star's picture, bird methyl 2-(methacryloyloxy) ethylammonium Sulfonate, bird methyl 3-(acryloylamino) propyl ammonium Acetate etc. can be mentioned.

[0040] As a desirable example of a monomer shown by \*\* 3 Diaryl dimethylammonium Chloride, diaryl diethyl ammonium Chloride, diaryl dimethylammonium A star's picture, diaryl dimethylammonium Sulfonate, diaryl dimethylammonium Acetate etc. can be mentioned.

[0041] moreover, as an anionic monomer which carries out an ionic bond to a cationic machine, works as a reaction site to a cross linking agent, and raises the water resisting property of the coat itself The monomer chosen from the anionic monomer shown by said general formula-ization 4 is desirable especially from the ability to raise the water resisting property of a coat by leaps and bounds, without worsening the absorptivity of ink.

[0042] R11 and R12 express a hydrogen atom, an alkyl group, a carboxyl group, or its salt among \*\* 4, and M expresses a hydrogen ion, ammonium ion, or a metal ion.

[0043] As a desirable example of an anionic monomer shown by \*\* 4, although copolymeric carboxylic acid, such as acrylic acid, methacrylic acid, crotonic acid, maleic acid, and fumaric acid, etc. is mentioned, this invention is not limited to these.

[0044] Moreover, the quantity of this anionic monomer that both ionicity water solubility polymer and anionic

water solubility polymer contain as a constitutional unit has [ each polymer ] 2 weight % or more and 30weight % or less of a desirable range. Since it becomes strong too much, and the viscosity of coating liquid may increase remarkably or an interaction with a cationic machine may produce gelling in introduction exceeding 30 weight %, it is not desirable. Since reactivity with a cross linking agent worsens at less than 2 weight %, or an ionic bond with a cationic machine becomes weak on the other hand and the water resisting property and hardness of a coat become weak, it is not desirable.

[0045] Moreover, although 70 to 90 weight % of the solvent of the ink for ink jet record is water, the high boiler of alcoholic systems, such as diethylene glycol, triethylene glycol, and glycerol, is usually used for the jam up ball prevention by desiccation of a head, or adjustment of the surface tension of ink. Therefore, although the polymer which constitutes an ink absorption layer absorbs water of course, you also have to absorb and hold the alcoholic solvent of these high boiling points. As a monomer component to satisfy, such conditions Acrylamide, methacrylamide, N and N-dimethyl acrylamide, N-isopropyl acrylamide, acryloyl morpholine, diacetone acrylamide, N-MECHIRORU acrylamide, N-vinyl pyrrolidone, and 2-methoxy ethyl acrylate can be mentioned. Since the compatibility over the ink solvent of polymer increases by carrying out copolymerization of these monomer components, the ink absorption capacity and the rate of absorption of polymer improve, and stickiness by the high boiler which remains without the ability evaporating on the polymer surface after printing is reduced.

[0046] Although it changes with the kinds and quantity of a high boiler in ink as a quantity of this monomer component In order to raise ink absorption capacity and a rate of absorption, the thing of both ionicity water solubility polymer and anionic water solubility polymer which either contains in 30 to 98weight % of the range as a constitutional unit at least is desirable.

[0047] Namely, both ionicity water solubility polymer or anionic water solubility polymer at least [ either ] As a constitutional unit, acrylamide, methacrylamide, N, and N-dimethyl acrylamide, N-methylacrylamide, N, and N-diethyl acrylamide, N-isopropyl acrylamide, Diacetone acrylamide, N-MECHIRORU acrylamide, acryloyl morpholine, The recorded material for ink jets of the description which reduced the feeling of stickiness by a high boiler was able to be offered by using the water-soluble polymer which contains at least one monomer component chosen from N-vinyl pyrrolidone and 2-METOSHIKI ethyl acrylate as a constitutional unit.

[0048] The polymer containing the quarternary-ammonium-salt machine in this invention is conventionally compoundable by the well-known polymerizing method. The radical polymerization method using a water-soluble azo initiator is desirable from the ease and economical efficiency of polymerization operation among the mixed solvent of water/alcohol in particular.

[0049] If ink absorbcency is not checked remarkably but three-dimensions bridge formation of the polymer is carried out as an aziridine cross linking agent used by this invention Although it does not need to be limited, especially Trimethylol propane tree beta-aziridinyl propionate, The aziridine cross linking agent chosen from N, N'-hexamethylene 1, 6-screw (1-aziridine cull me SAMIDO), and tetramethylolmethane tree beta-aziridinyl propionate is desirable especially from constructing a bridge effectively with the anionic monomer of the above-izing 4.

[0050] As for the amount of addition to both the ionicity water solubility polymer and the anionic polymer of an aziridine cross linking agent, it is desirable to be added in 0.1 to 10weight % of the range to the total amount of polymer. In the addition which less than [ this ] is especially inadequate as for bridge formation, and an effect is not accepted in a water resisting property, and exceeds 10 weight %, in order to form the

polymer over which bridge formation progressed to too much and the bridge was constructed by the altitude, the absorption capacity of an ink absorption layer falls extremely, and overflow arises in a solid printing part. Moreover, crawling and the white omission of ink by the cross linking agent itself may occur. As a quantity of an especially desirable aziridine cross linking agent, it is 0.5 to 5 weight % of a range to the total amount of this polymer.

[0051] [when manufacturing an ink jet recorded material in this invention, as a base material used, polyester film, resin covering paper, a coated paper, etc. are mainly used, for example, but] It will not be limited especially if it is the base material which can prepare an ink acceptance layer, such as glass, aluminium foil, vacuum evaporationo paper, and a deposition film.

[0052] Moreover, although an ink acceptance layer is prepared at least in one side of a base material, it is the purpose of preventing curl and may be prepared in both sides of a base material.

[0053] Although this invention relates to the ink jet recorded material which has the feeling of gloss of the printing paper tone of a photograph, and aesthetic property, in order to obtain the feeling of gloss of the printing paper tone of a photograph, and aesthetic property, not only the presentation of an ink absorption layer but the characteristics of a base material are important for it. [this invention persons] as a result of inquiring wholeheartedly, in order to obtain the feeling of gloss of the printing paper tone of a photograph, and aesthetic property The material and whiteness degree of the base material to be used are important, and when the whiteness degree W by the Lab color system of a base material used 80 or more polyester film or resin covering paper, the ink jet recorded material which has the feeling of gloss of a photograph tone and aesthetic property was able to be offered. When a coated paper with a high whiteness degree is used as a base material, the high feeling of gloss of the printing paper tone of a photograph is not obtained, but there are problems, like the color tone of a record picture becomes dark in polyester film with a low whiteness degree.

[0054] Moreover, in order to obtain the ink jet recorded material which has the feeling of gloss of a photograph tone, and aesthetic property, in the ink jet recorded material which prepared the ink absorption layer on the base material, it is desirable that the whiteness degree W by the Lab color system by the side of the ink absorption layer of this ink jet recorded material is 80 or more.

[0055] As the method of presentation of a whiteness degree, the whiteness degree W by a Lab color system with deep relation between lightness and saturation is desirable, although the aesthetic property of the photograph tone in the ink jet recorded material of this invention is expressed.

[0056] In addition, the whiteness degree W in a Lab color system is computed by the 1-4 following by measuring the tristimulus values X in an XYZ color system, Y, and Z. In addition, although several 1-4 are a formula about standard illuminant C, it can ask for the formula about the standard illuminants D65 using this color equation. However, the influence of the difference of the whiteness degree index W when using standard illuminant C and the standard illuminants D65 is very small when the ink jet recorded material which has the feeling of gloss of the photograph tone which is the purpose of this invention, and aesthetic property is offered.

[0057]

[Equation 1]

The whiteness degree by  $W=100-\{(100-L) 2+(a2+b2)\} / 2$  W:Lab color system.

L: The lightness index in a Lab color system.

a, the degree index of perceived color in a b:Lab color system.

[0058]

[Equation 2] The lightness index in L=10Y1 / 2 L:Lab color system.

Y: One of the tristimulus values in the XYZ color system by standard illuminant C

[0059]

[Equation 3] The degree index of perceived color in a=17.5 (1.02 X-Y) / Y1 / 2 a:Lab color system.

X Y: Tristimulus values in the XYZ color system by standard illuminant C.

[0060]

[Equation 4] The degree index of perceived color in b=7.0 (Y-0.847Z) / Y1 / 2 b:Lab color system.

Y, Z: Tristimulus values in the XYZ color system by standard illuminant C.

[0061] As a base material used for this invention, in particular when using polyester film, it is not necessary to restrict to the thickness but, and an about 10-200-micrometer thing is desirable from handling nature and the \*\*\*\* aptitude of a printer.

[0062] In this invention, [ polyester film ] Aromatic dicarboxylic acid, such as terephthalic acid, isophthalic acid, and naphthalene dicarboxylic acid, or ester of those, Ethylene glycol, diethylene glycol, 1, 4-butanediol, The polyester obtained by making carry out the polycondensation of the polyhydric alcohols, such as neopentyl glycol, is film-ized, and orientation processing is usually carried out by treatment of roll extension, tenter extension, inflation extension, etc. in many cases.

[0063] Although what carried out copolymerization of the other components to polyethylene terephthalate, polyethylene butylene terephthalate, polyethylene 2, 6-naphthalate, and these as an example of polyester is mentioned, this invention is not limited to these.

[0064] As a method of raising the whiteness degree of polyester film, there are a method of making inorganic particles, such as barium sulfate, titanium dioxide, calcium carbonate, a silicon dioxide, aluminium oxide, kaolin, and a talc, containing inside polyester film, the method of applying a white coating material to the surface, etc.

[0065] Moreover, in order to give cushioning properties and concealment nature, the cavernous content film containing much cavities, for example, foaming polyester film etc., can be used for the inside of a film.

[0066] As a base material used for this invention, also when using resin covering paper, it is not necessary to restrict in particular about thickness but, and a handling nature and the \*\*\*\* aptitude of a printer to about 50-300 micrometers thing is desirable. Moreover, in order to obtain the aesthetic property of the printing paper of a photograph, an about 200-300-micrometer thing is desirable.

[0067] Although the paper which the stencil paper for resin covering papers does not have restriction in particular, and is generally used can be used, smooth stencil paper which is used for the base material for photographs, for example is desirable preferably. as the pulp which constitutes stencil paper -- natural pulp, regenerated pulp, synthetic pulp, etc. -- one sort -- or two or more sorts are mixed and it is used. Additives generally used by paper manufacture, such as a sizing compound, a paper reinforcing agent, a loading material, an antistatic agent, a fluorescent brightener, and a color, are blended with this stencil paper.

Furthermore, surface spreading of a surface sizing compound, a surface paper durability agent, a fluorescent brightener, an antistatic agent, a color, the anchor agent, etc. may be carried out.

[0068] Moreover, the good thing of the surface smoothness carried out [ compress / during paper milling or after paper milling / a pressure / in a calender etc. / impress and ] of the stencil paper for resin covering

papers is desirable, and especially the thing for 200 seconds or more has Beck's desirable smoothness measured by JIS-P-8119. Moreover, as for the \*\*\*, 30-250g/m<sup>2</sup> is desirable.

[0069] Although the whiteness degree of the stencil paper for resin covering papers has a high whiteness degree in the brightness by Hunter measured by JIS-P-8123 being 65% or more and a recorded material with a high-class feeling is obtained, the whiteness degrees for which it asks for the purpose differ, and non-bleached [ of them ] may be carried out as natural pulp, and they may use together and use the blackish brown stencil paper using pulp. Moreover, you may use the stencil paper colored using colorants, such as a color.

[0070] As covering resin for resin covering papers, polyolefin resin is desirable and especially polyethylene resin is desirable. Moreover, low density polyethylene, medium density polyethylene, high density polyethylene, or these mixtures can be used. As for the low density polyethylene said here, a density is 0.915-0.930g/cm<sup>3</sup> and is usually manufactured with a high pressure process. On the other hand, a density is a thing of 0.950g/cm<sup>3</sup> or more, and high density polyethylene is usually manufactured by the low-pressure method or an inside pressure method. Independently, those two or more sorts can be mixed and what has various kinds of densities and melt flow rates can be used for these polyethylene resin.

[0071] The composition of the resin layer of resin covering paper may be multilayer any more than a lamina and a bilayer. Also in this case, independently, two or more sorts can be mixed and the above-mentioned polyolefin resin can be used. Moreover, it can also consider considering a multilayer each layer as a mutually different presentation as the same presentation. As a method of forming the resin layer which consists of a multilayer, you may adopt any of a coating method one by one with a co-extrusion coating method.

[0072] On the other hand, the resin layer of resin covering paper can be formed by KOTEINGU [ latex with film formation ability ]. For example, after KOTEINGU [ latex with the low minimum forming temperature (MFT) / the stencil paper for resin covering papers ], it can be formed also by overheating to the temperature more than the minimum forming temperature.

[0073] Although there is no restriction in particular as thickness of the coating resin layer of resin covering paper, generally a thickness of 5-50 micrometers is coated only with the surface by rear surface both sides.

[0074] In resin of resin covering paper, white pigments, such as titanium oxide, zinc oxide, a talc, and calcium carbonate, Fatty acid amide, such as octadecanamide and arachidic acid amide, zinc stearate, Fatty acid metal salt, such as calcium stearate, aluminum stearate, and magnesium stearate, The antioxidant of IRUGA NOx 1010 and IRUGA NOx 1076 grade, It can add combining suitably various kinds of additives, such as a pigment of magenta, such as blue pigments and colors, such as cobalt blue, ultramarine blue, sicilian blue, and copper phthalocyanine blue, cobalt violet, fast violet, and manganese purple, a color, a fluorescent brightener, and an ultraviolet ray absorbent.

[0075] The resin covering paper used as a base material in this invention is manufactured what is called by an extrusion coating method which casts the polyolefin resin which carried out heat melting on the stencil paper which runs. Moreover, in order to raise the adhesive property of resin and stencil paper, before covering resin in stencil paper, it is desirable to perform activation, such as corona discharge treatment and flame treatment, to stencil paper. According to the use, it has a glossy surface, a mat face, etc. and, as for the field (surface) where the ink acceptance layer of a base material is applied, especially a glossy surface is used preferably. It is more desirable to carry out resin covering from a point of curl prevention, although it is

not necessary to necessarily cover resin at the back. The back is usually a mat side and can perform activity treatment of corona discharge treatment, flame treatment, etc. also to rear surface both sides the surface or if needed.

[0076] Although this invention relates to an ink jet recorded material with high transparency usable as an OHP film, also in the recorded material of which the translucency of an OHP film etc. is required, not only the presentation of an ink absorption layer but the characteristics of a base material are important for it. [ the light transmittance state at the time of using it as an OHP film ] Rather than total light transmission, Hays (haze value) was closer to people's feeling, and when Hays (haze value) by JIS-K-7105 prepared the ink absorption layer of this invention at least in one side of 3.0 or less transparent base, the ink jet recorded material with high transparency was able to be offered.

[0077] Moreover, as for Hays of the ink jet recorded material at the time of using it as an OHP film, in the ink jet recorded material which prepared the ink absorption layer on the base material, it is desirable that Hays (haze value) by JIS-K-7105 of this ink jet recorded material is 5.0 or less.

[0078] In addition, Hays (haze value) measures diffused transmittance and total light transmission using integrating sphere type light transmission measuring apparatus, and what the ratio expresses is provided in JIS-K-7105.

[0079] In the recorded material of which the translucency of an OHP film etc. is required, although it is not necessary to restrict the thickness in particular of the base material to be used, an about 50-200-micrometer thing is desirable from handling nature and the \*\*\*\* aptitude of a printer.

[0080] Moreover, although related with the back print type recorded material with which a picture full color [ this invention ] even when it observes by which of transmission or a reflected light, and high definition is accepted In order to solve the above-mentioned technical problem, when this invention persons prepared the porous ink absorption layer to which the refractive index contained 1.7 or less pigment grain in the ink absorption layer of this invention which carried out three-dimensions bridge formation using the aziridine cross linking agent on the transparent base The back print type recorded material for ink jets which can obtain a clear full color picture in the background where a whiteness degree is high was able to be offered.

[0081] When an ink absorption layer contains pigment grains, since an ink absorption layer serves as porosity, the rate of absorption and absorption capacity of ink become very large. For this reason, desiccation of the printed ink is quick, and image density is high, and a clear picture without the blot by the limits of a color overlapping printing portion can be obtained. The whiteness degree of pigment grains [ such / especially ] of a nonimage area improves that the refractive index is 1.65 or less [ 1.45 or more ] 1.7 or less, and they become still clearer [ the picture when observing by transmission and a reflected light ]. An anatase type and a rutile type titanium dioxide (respectively refractive indices 2.55 and 2.70), although the whiteness degree of a nonimage area of the pigment grains with a bigger refractive index like zinc white (said -- 2.03) or white lead (said -- 2.09) than 1.7 is high, probably because the refractive index is too large, for uses which the quantity of light which penetrates a coated layer uses by transmission few, such as an electric-spectaculars signboard and labeling, a picture becomes dark. Moreover, ink cannot penetrate to a transparent base but the concentration of a picture is very low. On the other hand, if the refractive index of pigment grains is too small, probably because the polymer component and refractive index in an ink absorption layer are near, the opacity of a coated layer will fall, and if it observes by a reflected light from the base material side, the whiteness degree of a nonimage area is lacking and it cannot necessarily be

satisfied as a full color image.

[0082] Although such a refractive index can use commercial various things as 1.7 or less pigment grain Especially Heavy and precipitated calcium carbonate (refractive indices 1.49-1.66), magnesium carbonate (said -- 1.50), kaolin (said -- 1.55), and calcination Clay (said -- 1.60) -- a talc (said -- 1.57), a calcium silicate (said -- 1.5-1.6), and silica (said -- 1.4-1.5) -- aluminium hydroxide (said -- 1.53) and barium sulfate (said -- 1.64) -- As an organic pigment, moreover, urea-formalin resin (refractive indices 1.54-1.56), urea-thiourea-formalin resin (said -- 1.66) and melamine formalin resin (said -- 1.57) -- benzoguanamine formalin resin (said -- 1.57), melamine benzoguanamine formalin resin (said -- 1.57), polystyrene resin (said -- 1.59), polymethyl methacrylate resin (said -- 1.49), and polyethylene resin (said -- 1.55) are desirable.

[0083] [ when a refractive index makes an ink absorption layer contain 1.7 or less pigment grain, become a white layer with low transparency, but ] Furthermore, if the primary particle itself uses grains with a big specific surface area with small particle diameter with porosity, a whiteness degree will improve further, and since the actual surface area of an ink absorption layer moreover becomes large, the absorption capacity and velocity of ink increase. Therefore, as a specific surface area of pigment grains, more than 5m<sup>2</sup>/g is desirable. Moreover, as for the grain size of these pigment grains, 0.05-5 micrometers is desirable.

[0084] When manufacturing an ink jet recorded material in this invention, the coverage of the ink absorption layer prepared on a base material does not have restriction in particular, but 1-50g/m<sup>2</sup> is 3-30g/m<sup>2</sup> desirable still more preferably as solid content. When the coverage of an ink absorption layer is less than 1g/m<sup>2</sup>, the receptiveness of ink will be inferior and after-printing ink will overflow from an absorption layer. Moreover, in exceeding 50g/m<sup>2</sup>, the receptiveness of ink improves, but problems, such as a crack of an ink absorption layer and curl, occur.

[0085] In manufacturing an ink jet recorded material in this invention Even if it does not add a surface active agent, good spreading nature can be obtained in many cases, but since spreading nature is improved more, a surface active agent can be added for the purpose of adjusting a dot diameter when ink adheres to an ink absorption layer. Which type of an anion system, a cation system, the Nonion system, and a betaine system is sufficient as the surface active agent used, and a low-molecular thing or the low-molecular thing of a polymer is sufficient as it. You may use combining one sort or a two or more sort surface active agent. As for the amount of addition of a surface active agent, 0.001g-5g are desirable to the binder 100g which constitutes an ink absorption layer from an amount of solid content, and they are 0.01-3g more preferably.

[0086] Furthermore, to an ink absorption layer, various well-known additives other than the above-mentioned surface active agent, such as the fixing agent of an inorganic pigment, a coloring color, a color pigment, and an ink color, an ultraviolet ray absorbent, an antioxidant, the dispersant of a pigment, a defoaming agent, a leveling agent, antiseptics, a fluorescent brightener, a viscosity stabilizer, and a pH regulator, can also be added.

[0087] Moreover, in order to raise the definition of a picture, by containing the water repellent or the sizing compound of a fluororesin system, a silicone resin system, or an alkyl ketene dimer system in an ink absorption layer, a printing dot diameter can be controlled and the definition of a picture can be raised. What is generally marketed as the water repellent or the sizing compound of these fluororesin systems, a silicone resin system, or an alkyl ketene dimer system can be used. Moreover, either these solutions or a basin system emulsion is usable. A printing dot diameter is controllable with the amount of addition of such water repellents to an ink absorption layer. Although the amount of addition changes with each component,

concentration, and printing dot diameters to wish, it is usually 0.1 to 5 weight % especially preferably 0.05 to 10weight % to the total solids of an ink absorption layer as an effective formed element.

[0088] As the spreading method of the ink absorption layer coating liquid in this invention, the spreading methods usually used, such as a slide hopper method, a curtain method, an extrusion method, an air knife method, a roll coating method, and a rod bar coating method, are used, for example.

[0089] You may prepare an anchor layer in the base material in this invention for the purpose of the superiors for adhesive properties of an ink absorbing layer and a base material. An anchor layer can be made to add combining suitably solvent soluble binders, such as hydrophilic binders, such as gelatin, and butyral, latex, a curing agent, a pigment, a surface active agent, etc.

[0090] Various kinds of back coat layers can be painted on the base material in this invention for antistatic nature, conveyance nature, curl tightness, note nature, sizing nature, etc. A back coat layer can be made to add combining suitably an inorganic antistatic agent, an organic antistatic agent, a hydrophilic binder, latex, a curing agent, a pigment, lubricant, a surface active agent, etc.

[0091]

[Example] Hereafter, although a work example explains this invention in detail, the contents of this invention are not limited to a work example. In addition, that it is with a part means a weight part.

[0092] The copolymer which consists of monomer components shown in Tables 1-2 as both ionicity water solubility polymer was compounded.

[0093]

#### [Table 1]

両イオン性ポリマー	モノマー成分（重量比）
(Z-1)	DNAEMA-Q(10), AA(5), AAm(20), NVP(65)
(Z-2)	DNAEMA-Q(5), AA(30), AAm(15), NVP(50)
(Z-3)	DNAEMA-Q(10), AA(5), DMAAm(15), DMAAm(70)
(Z-4)	DNAEMA-Q(10), AA(5), DMAAm(85)
(Z-5)	DNAEMA-Q(40), AA(5), DMAAm(55)
(Z-6)	DNAEMA-Q(10), AA(5), DMAAm(15), DMAAm(70)
(Z-7)	DNAEMA-Q(10), AA(5), DMAAm(10), KTPAM(15), NVP(60)
(Z-8)	DNAEMA-Q(15), AA(5), DMAAm(25), N-VAm(5), NVP(25), DMAAm(25)
(Z-9)	DNAEMA-Q(10), AA(5), ACMO(85)
(Z-10)	DNAEMA-Q(10), AA(5), NVP(85)
(Z-11)	DNAEMA-Q(5), AA(2), NVP(93)
(Z-12)	DNAEMA-Q(5), AA(5), DMAAm(30), AAm(10), MEA(20)
(Z-13)	DNAEMA-Q(10), MA(5), DMAAm(85)
(Z-14)	DNA-AA-Q(10), AA(5), DMAAm(85)
(Z-15)	DNA-AA-Q(10), AA(5), DMAAm(45), NVP(40)
(Z-16)	DNA-AA-Q(10), AA(2), DMAAm(44), NVP(44)
(Z-17)	DNA'AA-Q(10), AA(5), DMAAm(45), ACMO(40)
(Z-18)	DNA'AA-Q(10), AA(5), DMAAm(45), NVP(40)
(Z-19)	VITM-Q(10), AA(5), DMAAm(45), NVP(40)
(Z-20)	DNBVB-Q(10), AA(5), DMAAm(45), NVP(40)

[0094]

#### [Table 2]

両イオン性ポリマー	モノマー成分（重量比）
(Z-21)	DNAEMA-BQ(95), AA(5)
(Z-22)	VHTM-Q(98), AA(2)
(Z-23)	DNBVB-Q(95), AA(5)
(Z-24)	DNAEMA-BQ(85), DMAPAAC-Q(10), AA(5)
(Z-25)	DNAEMA-BQ(50), VBTM-Q(45), AA(5)

[0095] The cable address of the monomer component shown all over Table 1-2 is as follows.

[0096] The five following sorts are cationic monomers.

DMAPAA-Q: The 4th class ghost by the methyl chloride of dimethylaminopropyl acrylamide (bird methyl 3-(acryloylamino) propyl ammonium) Chloride, DMAEMA-Q : The 4th class ghost by the methyl chloride of dimethylaminoethyl methacrylate (bird methyl 2-(methacryloyloxy) ethyl AMMONIMU chloride), DMAEMA-BQ : The 4th class ghost by the benzyl chloride of dimethylaminoethyl methacrylate (N and N-dimethyl N-benzyl N-2-(methacryloyloxy) ethyl AMMONIMU chloride), VBTM-Q:p-vinylbenzyl trimethylammonium Chloride, DMBVB-Q:N, and N-dimethyl N-benzyl N-p-vinylbenzyl ammonium Chloride, [0097] The two following sorts are anionic monomers.

AA: Acrylic acid, MA:methacrylic acid, [0098] It is the monomer which is not following any cationic and anionic, either. [ 11 sorts ]

AAm: Acrylamide, MAm : Methacrylamide, DMAAm:N, and N-dimethyl acrylamide, MAAm:N-methylacrylamide, DEAAm:N, and N-diethyl acrylamide, NIPAm:N-isopropyl acrylamide, DAAm:diacetone acrylamide, N-AMaM:N-MECHIRORU acrylamide, ACMO: Acryloyl MOROHORIN, NVP:N-vinyl pyrrolidone, MEA:2-methoxy ethyl acrylate, [0099] (Synthetic example of both the ionicity water solubility polymer used for an ink absorption layer) The synthetic example of both the ionicity water solubility polymer (Z-15) used for an ink absorption layer below is shown. Other polymer was compounded by the almost same operation. [0100] All of the used monomers, a solvent, and an initiator were commercial items, and further, refining was not carried out but was used as it was. 5g of acrylic acid, 350g of ion exchange water, and isopropyl alcohol 2g were taught to the 4 mouth flask of 1L, and aqueous ammonia (8.5% solution) adjusted pH to 7.2. 13.3g of 75% aqueous solution [ of bird methyl 3-(acryloylamino) propyl ammoniumchloride ], N, and N-dimethyl acrylamide 45g and N-vinyl pyrrolidone 40g were added, ion exchange water was added further, and the whole quantity was 500g. Nitrogen replaced the whole polymerization system, after heating at 60 degrees C, 0.5g of polymerization initiators V-50 (made by Wako Pure Chem) were supplied, and the polymerization was started. Then, after performing a polymerization at 60 degrees C for 6 hours, the 20% aqueous solution of both the ionicity water solubility polymer (Z-15) that cools after a 1-hour polymerization at 90 more degrees C, and is shown in Table 1 was obtained.

[0101] The copolymer which consists of monomer components shown in Table 3 as anionic water solubility polymer was compounded. The synthetic process was performed by the same operation as both ionicity water solubility polymer.

[0102]

[Table 3]

アニオン性ポリマー	モノマー成分 (重量比)
(A-1 )	AA(30), AAm(15), NVP(55)
(A-2 )	AA(5), DMAAm(95)
(A-3 )	AA(5), DEAAm(10), NIPAm(15), NVP(70)
(A-4 )	AA(5), DAAm(20), NVP(45), DMAAm(30)
(A-5 )	AA(5), ACMO(95)
(A-6 )	AA(5), NVP(95)
(A-7 )	AA(2), NVP(98)
(A-8 )	AA(5), DMAAm(45), AAm(10), MEA(20), NVP(20)
(A-9 )	AA(5), DMAAm(45), NVP(50)
(A-10 )	AA(5), DMAAm(50), ACMO(45)

[0103] The cable address of the monomer component shown all over Table 3 is the same as Tables 1-2.

[0104] (Production of an ink jet recorded material which has a water resisting property)

50 copies of 20% aqueous solutions of both the ionicity polymer (Z-15) shown in work-example 1 table 1 It diluted in 40 copies of water, the aqueous solution which added 0.3 copy of aziridine cross linking agent

tetramethylolmethane tree beta-aziridinyl propionate to this was made into coating liquid, and it was made to apply and dry so that the weight after drying on the surface of a thick art coated paper (120g/m<sup>2</sup> of \*\*\*\*) may become 3g/m<sup>2</sup>. It warmed at the temperature of 40 degrees C one whole day and night, and the recorded material for ink jets was obtained.

[0105] Instead of the art coated paper in work-example 2 work example 1, the recorded material for ink jets was obtained like the work example 1 except having used cast coated paper (120g/m<sup>2</sup> of \*\*\*\*).

[0106] Make it be the same as that of a work example 1 instead of aziridine cross linking agent tetramethylolmethane tree beta-aziridinyl propionate in work-example 3 work example 1 except having used aziridine cross linking agent trimethylol propane tree beta-aziridinyl propionate. The recorded material for ink jets was obtained.

[0107] Make it be the same as that of a work example 1 instead of aziridine cross linking agent tetramethylolmethane tree beta-aziridinyl propionate in work-example 4 work example 1 except having used the aziridine cross linking agent N, the N'-hexamethylene 1, and 6-screw (1-aziridine cull me SAMIDO). The recorded material for ink jets was obtained.

[0108] Five copies of 20% aqueous solutions of both the ionicity polymer (Z-21) shown in work-example 5 table 2 were diluted in 50 copies of water, and 45 copies of 20% aqueous solutions of both the ionicity polymer in Table 1 (Z-15) were mixed. The aqueous solution which added 0.3 copy of aziridine cross linking agent tetramethylolmethane tree beta-aziridinyl propionate was made this with coating liquid, and it was made to apply and dry so that the weight after drying on the surface of a thick art coated paper (120g/m<sup>2</sup> of \*\*\*\*) may become 3g/m<sup>2</sup>. It warmed at the temperature of 40 degrees C one whole day and night, and the recorded material for ink jets was obtained.

[0109] 45 copies of 20% aqueous solutions of the anionic polymer (A-8) shown in work-example 6 table 3 were diluted in 50 copies of water, and five copies of 20% aqueous solutions of both the ionicity polymer in Table 2 (Z-21) were mixed. The aqueous solution which added 0.3 copy of aziridine cross linking agent tetramethylolmethane tree beta-aziridinyl propionate was made this with coating liquid, and it was made to apply and dry so that the weight after drying on the surface of a thick art coated paper (120g/m<sup>2</sup> of \*\*\*\*) may become 3g/m<sup>2</sup>. It warmed at the temperature of 40 degrees C one whole day and night, and the recorded material for ink jets was obtained.

[0110] The recorded material for ink jets was obtained like the work example 1 except not having used the aziridine cross linking agent in comparative example 1 work example 1.

[0111] Instead of both the ionicity polymer in comparative example 2 work example 1, the recorded material for ink jets was obtained like the work example 1 except having used cationic polymer (DMAEMA-Q: homopolymer of the 4th class ghost by the methyl chloride of dimethylaminoethyl methacrylate).

[0112] The recorded material for ink jets was obtained like the work example 1 except having used the anionic polymer (A-8) shown in Table 3 instead of both the ionicity polymer in comparative example 3 work example 1.

[0113] Instead of 0.3 copy of aziridine cross linking agent in comparative example 4 work example 1, the recorded material for ink jets was obtained like the work example 1 except having used 0.8 copy of 40% aqueous solution of glyoxal as a cross linking agent.

[0114] (Evaluation) The ink jet recorded material obtained by work examples 1-6 and comparative examples 1-4 was printed using product made from canon full color inkjet printer BJC-600J. The following method

(examinations 1-4) estimated, and the result was shown in Table 4.

[0115] Solid part homogeneity: (Examination 1) The solid printing part was observed visually and the existence of nonuniformity was judged. What has nonuniformity in \*\* and a monochrome solid printing part in what has nonuniformity by color overlapping solid printing by being uniform in O and a monochrome solid printing part in that which is uniform in the solid printing part which carried out 2 color color overlapping was made into x.

[0116] Image density: (Examination 2) The reflection density of the solid printing part after after-printing 15-minute progress (black ink Records Department) was measured using Macbeth densitometer TR-1224.

[0117] Water resisting property (rate of image remaining): (Examination 3) It dipped in the stream for 5 minutes, and the reflection density of the solid printing part after desiccation (black ink Records Department) was measured. As compared with the initial concentration measured by (the examination 2), the rate of image remaining was computed by several 5 formula.

[0118]

[Equation 5] A (%) = $(B/C) \times 100$ : The rate of image remaining (unit %)

B: (Examination 3) Reflection density of the solid printing part measured by reflection density C:  
(examination 2) of the measured solid printing part [0119] Water resisting property (flood blot rate):  
(Examination 4) The filament of the 1-pixel pitch of magenta was printed and line width was measured. The line width after dipping into 25-degree C ion exchange water for 6 hours was measured, and the value computed by several 6 formula was made into the flood blot rate. If a flood blot rate is 150% or less as compared with early line width, if a water resisting property is 120% or less, visually, it can hardly be recognized practically satisfactorily.

[0120]

[Equation 6] A (%) = $(B/C) \times 100$ : Flood blot rate (unit %)

B: Line width after a waterproof examination (unit mum)

C: Line width before a waterproof examination (unit mum)

[0121]

[Table 4]

	ベタ部 均一性	画像濃度	画像残存率 (%)	混水にじみ率 (%)
実施例 1	O	2.43	89	135
実施例 2	O	2.42	90	140
実施例 3	O	2.48	92	141
実施例 4	O	2.40	91	138
実施例 5	O	2.42	95	104
実施例 6	O	2.45	99	135
比較例 1→	O	2.41	5	
比較例 2→	O	2.43	4	
比較例 3	O	2.39	2	
比較例 4→	△	2.35	1	

[0122] As for the thing of \* mark, an ink absorption layer peels from a base material on condition of (examination-3) among front.

[0123] (Production-1 of an ink jet recorded material which has gloss and a water resisting property) Although the example of production of the ink jet recorded material which has the gloss of a photograph tone and a water resisting property in the work examples 7-30 is shown, this invention is not limited to this.

[0124] 50 copies of 20% aqueous solutions of both the ionicity polymer (Z-1 to Z-20) shown in seven to work-example 26 table 1 Dilute in 40 copies of water respectively, and the aqueous solution which added

0.3 copy of aziridine cross linking agent tetramethylolmethane tree beta-aziridinyl propionate to these is made into coating liquid. After carrying out corona treatment of the surface of the resin covering paper described below, it was made to apply and dry so that the weight after drying on the surface of resin covering paper may become 10g/m<sup>2</sup>. It warmed at the temperature of 40 degrees C one whole day and night, and 20 sorts of recorded materials for ink jets were obtained.

[0125] (Production of resin covering paper) [ the surface of the stencil paper of 100g/m<sup>2</sup> of \*\*\*\* which consist of LBKP ] 25g/m<sup>2</sup> of resin composition things which consist of a low-density-polyethylene 85 weight part and a titanium dioxide 15 weight part are applied, and 20g/m<sup>2</sup> of resin composition things which become the back from a high-density-polyethylene 50 weight part and a low-density-polyethylene 50 weight part are applied. Resin covering paper was produced. It was 91.5 when the whiteness degree W by the Lab color system of this resin covering paper was measured. In addition, when the 20-degree specular gloss (Gs) of this resin covering paper was measured by the method of JIS-Z-8741, it was GS(20 degrees) = 1.5 only.

[0126] 50 copies of 20% aqueous solutions of both the ionicity polymer (Z-5) shown in work-example 27 table 1 Dilute in 50 copies of water and the aqueous solution which added 0.6 copy of aziridine cross linking agent tetramethylolmethane tree beta-aziridinyl propionate to this is made into coating liquid. After carrying out corona treatment of the surface of the resin covering paper described in the work examples 7-26, it was made to apply and dry so that the weight after drying on the surface of resin covering paper may become 5g/m<sup>2</sup>. 50 copies of 20% aqueous solutions of both the ionicity polymer (Z-10) shown in Table 1 Dilute in 50 copies of water and the aqueous solution which added 0.3 copy of aziridine cross linking agent tetramethylolmethane tree beta-aziridinyl propionate to this is made into coating liquid. It was made to apply and dry on the layer which applies both the above-mentioned ionicity polymer (Z-5) to the resin covering paper surface, was made to dry and was made to form, so that the weight after desiccation may become 5g/m<sup>2</sup> further. It warmed at the temperature of 40 degrees C one whole day and night, and the recorded material for ink jets was obtained.

[0127] 50 copies of 20% aqueous solutions of both the ionicity polymer in 28 to work-example 30 table 1 (Z-12 to Z-14) were respectively diluted in 50 copies of water, and the aqueous solution which added 0.3 copy of aziridine cross linking agent tetramethylolmethane tree beta-aziridinyl propionate to these was made into coating liquid. Barium sulfate is contained inside a film. The white polyester film (whiteness degree W= 91 by U2, the Teijin make, and a surface Lab color system) which raised the whiteness degree is used. After carrying out corona treatment of the surface of this white polyester film, coating liquid was applied and it was made to dry so that the weight after drying on the surface of white polyester film may become 10g/m<sup>2</sup>. It warmed at the temperature of 40 degrees C one whole day and night, and three sorts of recorded materials for ink jets were obtained.

[0128] The recorded material for ink jets was obtained like the work example 21 except not having used the aziridine cross linking agent in comparative example 5 work example 21.

[0129] Make it be the same as that of work examples 7-26 instead of both the ionicity polymer in comparative example 6 work examples 7-26 except having used cationic polymer (DMAEMA-Q: homopolymer of the 4th class ghost by the methyl chloride of dimethylaminoethyl methacrylate). The recorded material for ink jets was obtained.

[0130] The recorded material for ink jets was obtained like work examples 7-26 except having used the anionic polymer (A-8) shown in Table 3 instead of both the ionicity polymer in comparative example 7 work

examples 7-26.

[0131] Instead of 0.3 copy of aziridine cross linking agent in comparative example 8 work example 21, the recorded material for ink jets was obtained like the work example 21 except having used 0.8 copy of 40% aqueous solution of glyoxal as a cross linking agent.

[0132] (Evaluation) The ink jet recorded material obtained by work examples 7-30 and comparative examples 5-8 was printed using product made from canon full color inkjet printer BJC-600J. The test method and the following (examinations 5-6) test method of the above (examinations 1-3) estimated, and the result was shown in Tables 5-6.

[0133] Glossiness: (Examination 5) According to the method of JIS-Z-8741, the 20-degree specular gloss of the white part was measured using the Nippon Denshoku Industries gloss meter and VGS-300A. In order to have the aesthetic property of the printing paper tone of a photograph, it is desirable that the 20-degree specular gloss of a nonimage area is 40 or more.

[0134] Whiteness degree: (Examination 6) The whiteness degree W by a Lab color system was measured using the Nippon Denshoku Industries degree meter of color difference, and ND-1001DP. In order to have the aesthetic property of the printing paper tone of a photograph, it is desirable that the whiteness degree W of a nonimage area is 80 or more.

[0135]

[Table 5]

実施例	両イオン性 ポリマー	ベタ部 均一性	画像濃度	画像残存率 (%)	光沢 (%)	白色度
7	(Z-1)	○	2.43	92	60	92.5
8	(Z-2)	○	2.48	93	62	92.6
9	(Z-3)	○	2.52	92	63	91.9
実施例 10	(Z-4)	○	2.55	95	66	92.5
実施例 11	(Z-5)	○	2.43	93	66	92.2
実施例 12	(Z-6)	○	2.46	95	63	92.9
実施例 13	(Z-7)	○	2.61	95	61	93.0
実施例 14	(Z-8)	○	2.65	95	65	92.4
実施例 15	(Z-9)	○	2.46	93	67	93.3
実施例 16	(Z-10)	○	2.52	94	70	92.8
実施例 17	(Z-11)	○	2.48	91	60	93.2
実施例 18	(Z-12)	○	2.68	89	84	92.3
実施例 19	(Z-13)	○	2.53	90	67	92.4
実施例 20	(Z-14)	○	2.52	97	63	93.1
実施例 21	(Z-15)	○	2.60	99	63	93.2
実施例 22	(Z-16)	○	2.50	95	84	93.3
実施例 23	(Z-17)	○	2.48	97	67	93.0
実施例 24	(Z-18)	○	2.49	89	62	92.2
実施例 25	(Z-19)	○	2.52	89	59	92.5
実施例 26	(Z-20)	○	2.60	90	57	92.2

[0136]

[Table 6]

実施例	両イオン性 ポリマー	ベタ部 均一性	画像濃度	画像残存率 (%)	光沢 (%)	白色度
2	(Z-5), (Z-10)	○	2.60	94	67	92.4
3	(Z-12)	○	2.63	89	67	93.0
4	(Z-13)	○	2.51	90	71	92.9
実施例 5	(Z-14)	○	2.52	98	68	92.1
比較例 5*	(Z-15)	○	2.58	0	70	90.4
比較例 6*		○	2.51	0	56	91.4
比較例 7*		○	2.60	5	63	92.4
比較例 8*	(Z-15)	×	2.51	0	55	90.0

[0137] As for the thing of \* mark, an ink absorption layer peels from a base material on condition of (examination-3) among front.

[0138] (Production-2 of an ink jet recorded material which has gloss and a water resisting property) Both the ionicity water solubility polymer that has a hydrophobic high base in the work examples 31-36, and both the ionicity water solubility polymer that has the high base of hydrophilicity are mixed. Also in the bottom of the very severe condition of it being neglected in the state humid for a long period of time, or being neglected underwater for a long period of time, without spoiling ink absorbency by using it, Problems, like a color bleeds in a coat are solvable, and although the example of production of the ink jet recorded material which has a very high water resisting property is shown, this invention is not limited to this.

[0139] Five copies of 20% aqueous solutions of both the ionicity polymer (Z-21 to Z-25) shown in 31 to work-example 35 table 2 were respectively diluted in 50 copies of water, and 45 copies of 20% aqueous solutions of both the ionicity polymer in Table 1 (Z-15) were mixed to these. It is aziridine cross linking agent tetramethylolmethane tree beta-aziridinyl propionate to this. After making into coating liquid the aqueous solution added 0.3 copy and carrying out corona treatment of the surface of the resin covering paper described in the work examples 7-26, it was made to apply and dry so that the weight after drying on the surface of resin covering paper may become 10g/m<sup>2</sup>. It warmed at the temperature of 40 degrees C one whole day and night, and five sorts of recorded materials for ink jets were obtained.

[0140] Five copies of 20% aqueous solutions of both the ionicity polymer (Z-21) shown in work-example 36 table 2 were diluted in 50 copies of water, and 45 copies of 20% aqueous solutions of both the ionicity polymer in Table 1 (Z-15) were mixed. The aqueous solution which added 0.3 copy of aziridine cross linking agent tetramethylolmethane tree beta-aziridinyl propionate was made this with coating liquid. Barium sulfate is contained inside a film. The white polyester film (whiteness degree W= 91 by U2, the Teijin make, and a surface Lab color system) which raised the whiteness degree is used. After carrying out corona treatment of the surface of this white polyester film, coating liquid was applied and it was made to dry so that the weight after drying on the surface of white polyester film may become 10g/m<sup>2</sup>. It warmed at the temperature of 40 degrees C one whole day and night, and the recorded material for ink jets was obtained.

[0141] (Evaluation) The ink jet recorded material obtained in the work examples 31-36 was printed using product made from canon full color inkjet printer BJC-600J. The test method of the above (examinations 1-6) estimated, and the result was shown in Table 7.

#### [0142]

Table 7

両イオン性 ポリマー	ペタ部 均一性	画像濃度	画像残存率 (%)	光沢 (%)	白色度
実施例 3.1	(Z-15), (Z-21)	○	2.52	98	60
実施例 3.2	(Z-15), (Z-22)	○	2.45	99	62
実施例 3.3	(Z-15), (Z-23)	○	2.43	98	63
実施例 3.4	(Z-15), (Z-24)	○	2.52	98	66
実施例 3.5	(Z-15), (Z-25)	○	2.48	97	60
実施例 3.6	(Z-15), (Z-21)	○	2.52	97	92.2

[0143] (Production-3 of an ink jet recorded material which has gloss and a water resisting property) Although the example of production of the ink jet recorded material which has the gloss of the photograph tone which used the quick anionic water solubility polymer of ink drying property for work examples 37-48 is shown, this invention is not limited to this.

[0144] In addition, there is no fixability of ink in anionic water solubility polymer, and ink drying property was able to be raised, without spoiling a water resisting property by mixing and using both the ionicity water solubility polymer and the anionic water solubility polymer in this invention.

[0145] 45 copies of 20% aqueous solutions of the anionic polymer (A-1 to A-10) shown in 37 to work-example 46 table 3 were respectively diluted in 50 copies of water, and five copies of 20% aqueous solutions of both the ionicity polymer in Table 2 (Z-21) were mixed. It is aziridine cross linking agent tetramethylolmethane tree beta-aziridinyl propionate to these. After making into coating liquid the aqueous solution added 0.3 copy and carrying out corona treatment of the surface of the resin covering paper described in the work examples 7-26, it was made to apply and dry so that the weight after drying on the surface of resin covering paper may become 10g/m<sup>2</sup>. It warmed at the temperature of 40 degrees C one whole day and night, and ten sorts of recorded materials for ink jets were obtained.

[0146] Instead of the resin covering paper in work-example 47 work example 42, barium sulfate is contained inside a film. The recorded material for ink jets was obtained like the work example 42 except having used the white polyester film (whiteness degree W= 91 by U2, the Teijin make, and a surface Lab color system) which raised the whiteness degree.

[0147] Instead of the resin covering paper in work-example 48 work example 42, the recorded material for ink jets was obtained like the work example 42 on the resin covering paper which prepared the easy-bonding layer using the resin covering paper which prepared the following surface easy-bonding layer except not having performed corona treatment.

[0148] After carrying out corona treatment of the surface of the resin covering paper described in the work examples 7-26, (Production of resin covering paper which prepared the surface easy-bonding layer) It is 20 copies of 10% warm water solutions and the surface active agent ([ and ]) of gelatin (gelatin which used as the raw material the collagen obtained from the Broome hardness 280 and a pig skin) to 80 copies of warm water. [ SHINTOREKKISU ] The solution which added the Nippon Oil & Fats 0.01 copy, and carried out stirring mixing is applied so that dry weight may become 0.1g/m<sup>2</sup> on the surface of resin covering paper. The surface easy-bonding layer (anchor layer) was prepared.

[0149] (Evaluation) The ink jet recorded material obtained in the work examples 37-48 was printed using product made from canon full color inkjet printer BJC-600J. The method of the above (examinations 1-6) estimated, and the result was shown in Table 8.

[0150]

[Table 8]

	アニオン性 ポリマー	ベタ型 均一性	画像濃度 (OD)	画像残存率 (%)	光沢 (%)	白色度
実施例 3 7	(A-1)	○	2.48	98	60	92.9
実施例 3 8	(A-2)	○	2.45	99	62	93.0
実施例 3 9	(A-3)	○	2.43	96	63	92.2
実施例 4 0	(A-4)	○	2.52	98	66	92.5
実施例 4 1	(A-5)	○	2.58	97	60	92.6
実施例 4 2	(A-6)	○	2.61	98	61	91.9
実施例 4 3	(A-7)	○	2.50	97	62	92.7
実施例 4 4	(A-8)	○	2.55	97	63	92.8
実施例 4 5	(A-9)	○	2.58	98	71	93.0
実施例 4 6	(A-10)	○	2.60	97	60	92.9
実施例 4 7	(A-6)	○	2.52	98	73	92.0
実施例 4 8	(A-6)	○	2.58	97	60	92.6

[0151] (Production of an ink jet recorded material with high transparency) Although the example of production of an ink jet recorded material with high transparency usable as an OHP film is shown in work examples 49-52, this invention is not limited to this.

[0152] Make it be the same as that of a work example 21 using the transparent polyester film (Lumilier 125T, Toray Industries make) which performed surface easily-adhesive treatment in which Hays (haze value) by

JIS-K-7105 was 2.19 instead of the resin covering paper in work-example 49 work example 21 except not having carried out corona treatment. The ink jet recorded material was obtained.

[0153] The ink jet recorded material was obtained like the work example 21 except Hays (haze value) by JIS-K-7105 having used the transparent cellulose acetate film (FUJITAKKU 0.125, FUJIFILM make) which is 0.80 instead of the resin covering paper in work-example 50 work example 21.

[0154] Make it be the same as that of a work example 31 using the transparent polyester film (Lumiler 125T, Toray Industries make) which performed surface easily-adhesive treatment in which Hays (haze value) by JIS-K-7105 was 2.19 instead of the resin covering paper in work-example 51 work example 31 except not having carried out corona treatment. The ink jet recorded material was obtained.

[0155] Make it be the same as that of a work example 42 using the transparent polyester film (Lumiler 125T, Toray Industries make) which performed surface easily-adhesive treatment in which Hays (haze value) by JIS-K-7105 was 2.19 instead of the resin covering paper in work-example 52 work example 42 except not having carried out corona treatment. The ink jet recorded material was obtained.

[0156] The recorded material for ink jets was obtained like the work example 49 except Hays (haze value) by JIS-K-7105 having used the translucency polyester film which is 10.2 instead of the transparent polyester film in comparative example 9 work example 49.

[0157] The recorded material for ink jets was obtained like the work example 49 except having used the anionic polymer (A-8) shown in Table 3 instead of both the ionicity polymer in comparative example 10 work example 49.

[0158] (Evaluation) The ink jet recorded material obtained by work examples 49-52 and comparative examples 9-10 was printed using product made from canon full color inkjet printer BJC-600J. The test method and the following (examinations 7-9) test method of the above (examination 1) estimated, and the result was shown in Table 9.

[0159] Image density: (Examination 7) The transmission density of the solid printing part after after-printing 15-minute progress (black ink Records Department) was measured using Macbeth densitometer TR-1224.

[0160] Water resisting property (rate of image remaining): (Examination 8) It dipped in the stream for 5 minutes, and the transmission density of the solid printing part after desiccation (black ink Records Department) was measured. As compared with the initial concentration measured by (the examination 7), the rate of image remaining was computed by several 7 formula.

[0161]

[Equation 7] A (%) = $(B/C) \times 100$ : The rate of image remaining (unit %)

B: (Examination 8) Transmission density of the solid printing part measured by transmission density C: (examination 7) of the measured solid printing part [0162] Hays (haze value): (Examination 9) According to the method of JIS-K-7105, Hays (haze value) of the non-printed part was measured using the Nippon Denshoku Industries gloss meter and NDH-300A. When using as an OHP film, as for Hays of a non-printed part, 5.0 or less are desirable, and a projection picture will become dark if 5.0 is exceeded.

[0163]

[Table 9]

ペタ部 均一性	画像濃度 (OD)	画像残存率 (%)	ヘーツ (%)
実施例49	O	1.69	98
実施例50	O	1.72	99
実施例51	O	1.69	98
実施例52	O	1.69	98
比較例9	O	1.69	97
比較例10	O	1.65	0
			16.5
			2.3

[0164] (Production of a back print type ink jet recorded material) Although the example of production of the back print type ink jet recorded material which observes the picture printed by the mirror image of the original image from the ink absorption layer side in the work examples 53-58 from the transparent base side is shown, this invention is not limited to this.

[0165] Five copies of 20% aqueous solutions of both the ionicity polymer (Z-21) shown in work-example 53 table 2 were diluted in 34 copies of water, and 45 copies of 20% aqueous solutions of both the ionicity polymer in Table 1 (Z-15) were mixed. 0.3 copy was added for six copies of urea-formalin resin (the Nippon Kasei Chemical make, an organic filler, a refractive index 1.5 [ about ], BET specific surface area10-20m<sup>2</sup>/g), ten copies of isopropyl alcohol, and aziridine cross linking agent tetramethylolmethane tree beta-aziridinyl propionate to this. It stirred with the homogenizer for 5 minutes at 10,000rpm, and the coating liquid of the ink absorption layer was prepared. Coating liquid was applied and the surface of the transparent polyester film (OLY-100, Teijin make) which carried out easily-adhesive treatment was made to dry this coating liquid so that the weight after desiccation may become 8g/m<sup>2</sup>. It warmed at the temperature of 40 degrees C one whole day and night, and the recorded material for ink jets was obtained.

[0166] It replaced with urea-formalin resin of work-example 54 work example 53, and the recorded material for ink jets was produced like the work example 53 except having used silica (SAIRISHIA 350, the product made from Fuji SHIRISHIA, refractive indices 1.46, BET specific surface area300m<sup>2</sup>/g).

[0167] It replaced with urea-formalin resin of work-example 55 work example 53, and the recorded material for ink jets was produced like the work example 53 except having used calcium carbonate (made in [ Shiroishi Central Research Laboratory ] Carla Ito KT, a calcite type, refractive indices 1.49-1.66, BET specific surface area33m<sup>2</sup>/g).

[0168] It replaced with six copies of urea-formalin resin of work-example 56 work example 53, and the recorded material for ink jets was produced like the work example 53 except having used seven copies of melamine formalin resin (the EPO star S, the NIPPON SHOKUBAI make, refractive indices 1.57 [ about ], BET specific surface area20m<sup>2</sup>/g).

[0169] It replaced with six copies of urea-formalin resin of work-example 57 work example 53, and the recorded material for ink jets was produced like the work example 53 except having used 7.5 copies of benzoguanamine formalin resin (the EPO star S6, the NIPPON SHOKUBAI make, refractive indices 1.57 [ about ], BET specific surface area7m<sup>2</sup>/g).

[0170] One copy of anatase form titanium oxide (TIPPAQUE A-100, the Ishihara Sangyo make, refractive index 2.52) was added to everything but six copies of urea-formalin resin of work-example 58 work example 53, and the recorded material for ink jets was produced like the work example 53 except having prepared the coating liquid of the ink absorption layer.

[0171] It replaced with six copies of urea-formalin resin of comparative example 11 work example 53, and the recorded material for ink jets was produced like the work example 53 except having used zinc oxide

(SAZEKKUSU No. 3, the Sakai Chemical Industry make, refractive indices 2.01, BET specific surface area 5.0m<sup>2</sup>/g).

[0172] Five copies of 20% aqueous solutions of both the ionicity polymer (Z-21) of comparative example 12 work example 53 are diluted in 34 copies of water. Replace with the mixed liquor which mixed 45 copies of 20% aqueous solutions of both the ionicity polymer in Table 1 (Z-15), and make it be the same as that of a work example 53 except having used 100 copies of 10-weight % aqueous solutions of polyvinyl alcohol (Gosenol NM-11, Nippon Synthetic Chemical Industry make). The recorded material for ink jets was produced.

[0173] (Evaluation) The ink jet recorded material obtained by work examples 53-58 and comparative examples 11-12 was printed using product made from canon full color inkjet printer BJC-600J. The test method and the following (examinations 10-11) test method of the above (examinations 1-3) estimated, and the result was shown in Table 10. In addition, printing was performed from the ink absorption layer side, and measurement and observation were performed [ side / polyester film ] from the printed ink absorption layer side.

[0174] Whiteness degree: (Examination 10) It measured according to the brightness-by-Hunter test method of JIS-P-8123. If there is 60% or more of a whiteness degree of a nonimage area, it is satisfactory practically.

[0175] Opacity: (Examination 11) It measured according to the opacity test method of JIS-P-8138. If there is 40% or more of opacity of a nonimage area, it is satisfactory practically.

[0176]

[Table 10]

	白色度 (%)	不透明度 (%)	画像濃度	ハダ部 均一性	画像残存率 (%)
実施例 5.3	81.7	55.7	2.02	○	98
実施例 5.4	82.5	61.2	1.99	○	99
実施例 5.5	80.9	60.9	1.89	○	97
実施例 5.6	82.7	47.8	1.97	○	96
実施例 5.7	77.6	44.1	1.87	○	99
実施例 5.8	84.2	64.2	2.01	○	97
比較例 1.1	88.4	78.2	1.02	×	87
比較例 1.2	84.7	47.9	1.22	△	0

[0177]

[Effect of the Invention] The surface of the recorded material was able to dissolve in water by adhesion of waterdrop like [ it is \*\*\*\*\* and ] from the work example, and the color was able to dissolve in water and the ink jet recorded material which solved the problem on which record is destroyed by that a color bleeds in a coat etc. was able to be offered [ \*\*\* / flowing out of a coat ]. As the recorded material for ink jets with which especially the request by color record has the gloss of a high photograph tone, and an OHP film The whiteness degree of the recorded material with usable high transparency and the nonimage area was high, and even when it observed by which of transmission or a reflected light, \*\*\*\*\* which offers the object for ink jet record suitable for the back print type recorded material with which a full color and high definition picture is accepted was able to be offered.

[Translation done.]